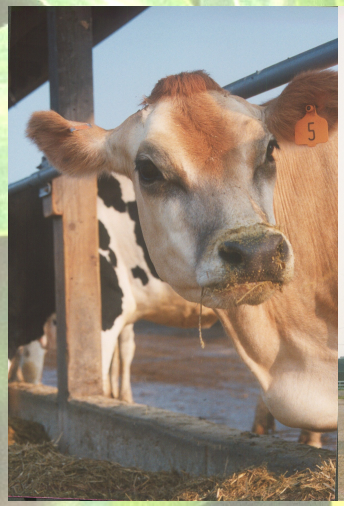
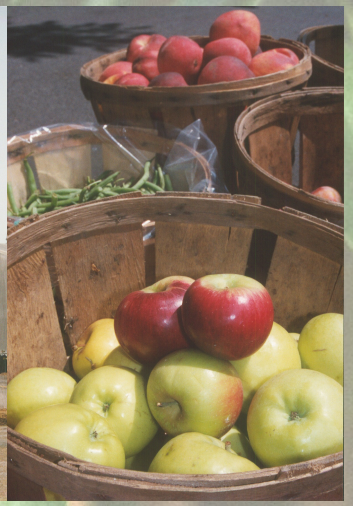
RADIOLOGICAL EMERGENCY INFORMATION

FOR DELAWARE FARMERS, FOOD PROCESSORS AND DISTRIBUTORS





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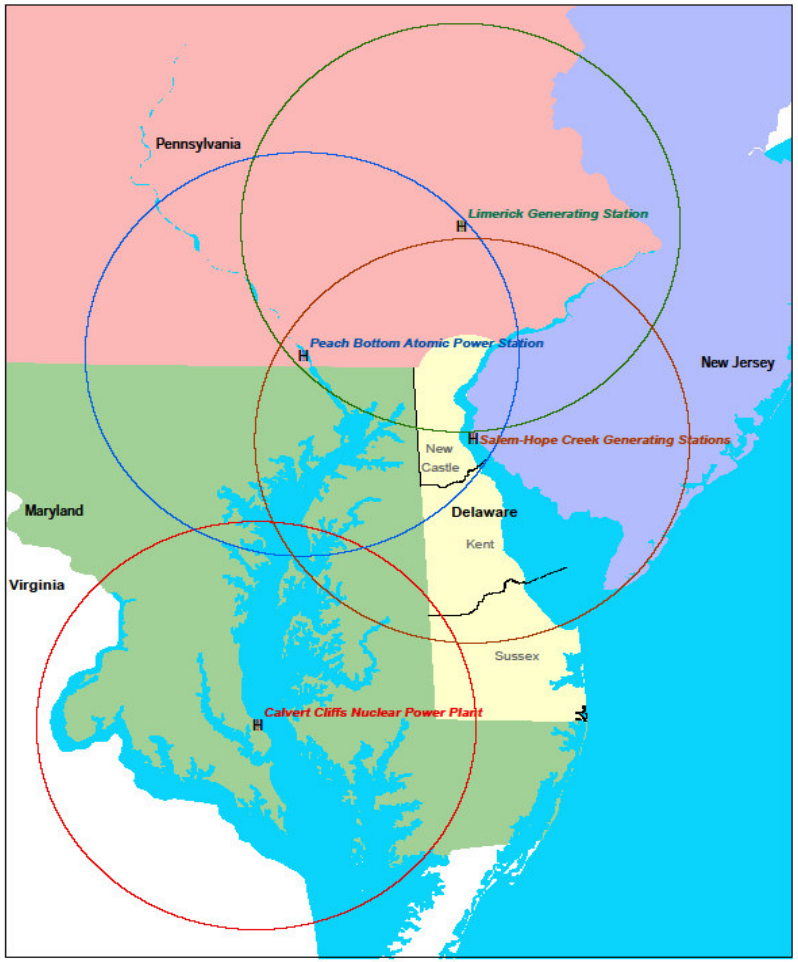
This Booklet has been prepared by the Delaware Emergency Management Agency (DEMA), Delaware Department of Agriculture (DDA) and the United States Department of Agriculture (USDA) to provide guidance to members of the agricultural community with farms, food processing, transporting, and distributing facilities within 50 miles of a Nuclear Power Station (See map Section 2). It explains the actions which you may be advised to take in order to protect your livestock, crops and food products in the event of a radiological emergency. It also provides some tips to help you be prepared for a radiological incident. Please read and become familiar with the information in this booklet. Keep it in a convenient place for future reference.

1. INTRODUCTION

If a radiological emergency occurs, DEMA will determine what areas within Delaware may be affected. DEMA will provide Field Sampling Teams to take soil, milk, water, and food samples to determine if there are any radiological concerns in your area.

Therefore, be prepared to follow the guidelines for protecting and caring of livestock, giving lactating animal's first priority by sheltering them, and using feed and water from protected sources. There is no need to automatically destroy milk or other farm produce you feel may be contaminated. State agencies will sample milk, produce, and other food products for contamination levels. The result of these tests will be used to advise you of the status of your food products.

2. MAP OF NUCLEAR POWER PLANT FACILITIES AND 50-MILE RADIUS PLANNING ZONES WHICH MAY AFFECT DELAWARE



Salem-Hope Creek Nuclear Generating Stations

Limerick Generating Station

Calvert Cliffs Nuclear Power Plant

Peach Bottom Atomic Power Station

3. PURPOSE

The purpose of this booklet is to provide information to farmers, livestock owners, fruit and vegetable growers, food processors, and food distributors about actions that you may need to take if a radiological emergency occurs at a nuclear power plant affecting Delaware. **This booklet is focused on animals and plants that are likely to be in the human food chain.** Owners of other animals such as household pets and horses should refer to local news releases at the time of a radiological incident for guidance and information.

The State of Delaware has developed this emergency response plan to support and serve the farm and agricultural community in the event of a nuclear power plant emergency. This booklet also contains information on how you would be notified and what procedures you could be asked to follow.

4. IF THERE IS AN EMERGENCY, WHO WILL PROVIDE GUIDANCE?

Upon notification of a radiological emergency affecting the state, the State of Delaware will dispatch radiation monitoring and sampling teams. Extensive monitoring during and after a release of radiation would determine the exact locations that may be contaminated, and the appropriate actions to take. Emergency information and instructions will be provided to the public over the Emergency Alert System (EAS) local radio stations, as well as by other means.

State and local officials will keep all farmers, food processors and distributors in the affected area(s) informed of major developments concerning the radiological emergency. Specific instructions concerning restriction of trade, special washing or preparation of food and dairy products, precautionary measures, as well as additional protective actions will be supplied to you through various

media outlets by your federal and state agricultural officials and other contacts in the food distribution chain. These instructions will include actions to follow to protect yourself, your family, your livestock, and your crops.

5. HOW WILL YOU BE NOTIFIED IN AN EMERGENCY?

In the event of an emergency, state and local officials, through the Emergency Alert System (EAS) and news advisories, will advise you of the necessary precautions to take. If the emergency may affect farming, food processing or distributors in your area, specific instructions from the Delaware Department of Agriculture will be issued over EAS stations by state officials. In the towns within the 10-mile Plume Emergency Planning Zone (EPZ), the sounding of sirens will advise people to tune in to the Emergency Alert System.

For towns outside the 10-mile Emergency Planning Zone but inside the 50-mile Emergency Planning Zone, the radio and television stations in the affected counties will carry Emergency Alert System (EAS) messages and news releases concerning the Delaware response to the incident. Listeners and viewers should be aware that radio and TV stations in neighboring states will also have similar messages, as well. However, Delaware residents should follow the instructions originating from Delaware stations because conditions in Delaware may differ from those experienced in other states.

6. BE PREPARED

1. Here are some things you can do now to prepare for an emergency:

2. Read and understand this brochure and keep it in a convenient place.

3. Plan where you would shelter your animals. Decide which animals would require immediate shelter. If you do not have enough shelter for all, determine priorities.

4. Plan to provide your livestock and poultry with stored feed and water.

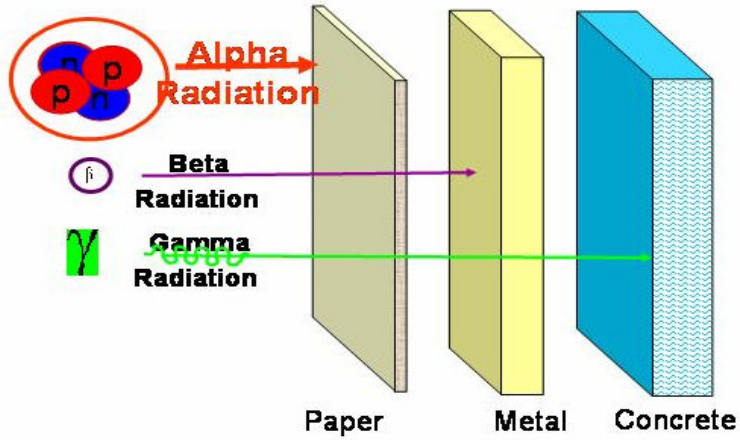
5. For information, contact the

   Delaware Department of Agriculture (DDA)
   Telephone No.: (302) 698-4500

   Delaware Emergency Management Agency (DEMA) Telephone No.: (302) 659-3362 or (877) 729-3362 (in state only)

   United States Department of Agriculture (USDA)
   Telephone No.: (302) 678-4250

6. In an emergency listen to your local radio or television station that issues Delaware Emergency Alert System broadcasts for additional and up-to-date information.



7. UNDERSTANDING RADIATION

Radiation is energy in motion – it is tasteless, odorless and invisible. Naturally occurring radioactive materials are present in our bodies, in our homes, in the soil, and in the food and water we consume. Radioactive gases are also present in the air we breathe. These naturally occurring forms of radiation are referred to as "background radiation" and account for more than half of the exposure we normally receive.

In addition to natural background radiation, there are other sources of exposure. The largest source of radiation exposure to the average individual comes from the medical and dental use of X-rays and from the use of radioactive materials to diagnose and treat disease.

Radiation produces charged particles or "ions" as it moves through material. This is called "ionizing" radiation. Alpha (α), beta (β), gamma (γ) radiation and X-rays are all forms of ionizing radiation. Alpha particles may be stopped by a sheet of paper. Beta particles may be stopped by a thin sheet of

metal. Gamma rays are the most penetrating and may be effectively stopped by concrete or lead.

The harm that may come to you from radiation will depend on the nature and energy level of the radiation to which you are exposed, the length of time you are exposed to it, how much of your body is exposed, and how much radioactive material is collected in your body.

8. *TYPICAL RADIATION EXPOSURE LEVELS*

Sources and Radiation Dose (average dose in millirem)	
One to Two packs of cigarettes daily	1300 – 2000/yr*
Indoor radon	200 – 300/yr**
Air-Food-Water	36/yr
Chest X-ray	20/test
The Earth (Atlantic Coast)	16/yr
Round trip, coast-to-coast plane trip	4/trip
Living next to a nuclear power plant	1/yr

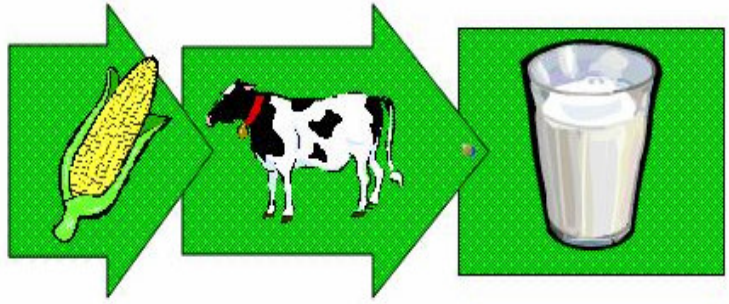
* This dose is primarily to the lungs

** Actual dose can vary greatly depending on factors such as how well a house is ventilated.

The biological affect of radiation on humans is measured in units called millirem. The average person receives about 360 millirem a year from background radiation. Man-made sources such as dental and medical X-rays can contribute, on the average, 60 of that 360 millirem per year. These amounts are not considered likely to lead to any adverse health consequences.

9. RELEASE OF RADIOACTIVE MATERIAL FROM A NUCLEAR POWER PLANT

A release of radioactivity from a nuclear power plant in an accident may send gases and tiny particles into the environment. The gases and particles would be spread by the wind and eventually fall to the earth. The actual distance that radioactive gases and particles would travel depends primarily on weather conditions. Heavier particles fall more quickly and deposit near the point of release. Strong winds spread lighter gases and particles over a larger area, greatly reducing the contamination of radioactive material on the ground. Rain increases the rate at which particles fall to earth from the plume and may increase the concentration of radioactive material on the ground in much localized areas.



10. CONTAMINATION

Contamination is the presence of radioactive materials in unwanted locations. People, animals, plants, soil, water, and farm equipment may become contaminated. People, plants, and animals can be contaminated either internally or externally.

Internal contamination can occur by breathing radioactive gases and particles in the air, by eating contaminated food, or by drinking contaminated water or milk, or through direct absorption. Therefore, it is necessary to take special precautions with farm animals and crops to prevent contamination from entering the food chain. Radioactive material that is ingested may result in long-term exposure and could lead to significant health concerns.

External contamination is caused by radioactive gases and particles lying on any surface. If radioactive material is deposited on the skin or other surfaces, the person, animal, or plant is then considered to be contaminated. Decontamination is possible and may be accomplished by various methods.

11. EXPOSURE VERSUS CONTAMINATION

The terms “exposure” and “contamination” are frequently confused and can be distinguished from one another with a farm analogy. If you have a manure pile and you are close enough to smell it, you are exposed. If, you remove yourself from the area affected by the odor, you are no longer exposed. If on the other hand, you step in the manure, you are contaminated. After stepping in the manure, you now have the potential to spread that contamination on your farm or to other locations.

If you are still concerned with radiation exposure or contamination, please contact your state agriculture or emergency management officials.

12. HOW LONG CAN RADIATION BE HARMFUL?

Radioactive materials decay at specific rates. Exposure from radiation is greatest during the first few hours and days following the release and deposition of radioactive materials. Those materials that remain in the air for longer periods of time lose much of their radioactivity before they settle to earth. The intensity of radiation decreases with the passage of time as radioactive materials decay.

13. PRECAUTIONARY ACTIONS

Why is water and feed that an animal consumes during a radioactive release a concern? When food-producing animals eat or drink contaminated feed or water, some radioactive materials may be passed through the food chain in eggs, meat or milk. Protecting food-producing animals is essential to minimize the possibility of contaminating the food chain and endangering public health.

14. SHELTERING ANIMALS

You may be asked to shelter your farm animals and give them protected feed and water. This will help prevent contamination from harming your animals, and from entering the human food supply.

Dairy cows and other lactating animals should be given priority because these animals can pass contamination on to their off-spring or humans through their milk. It is important to note that radiation and other contaminants have an affinity for milk**.**

Please remember that all food-producing animals should **be** given priority for cover and protected feed and water. Barns, milking parlors, machine sheds, garages, corn cribs, and swine or poultry buildings are all possible livestock shelters.

Generally, masonry or concrete buildings offer the best protection. An open building, such as a pole barn, provides the least protection.

Although a ventilation system is needed to keep sheltered Livestock healthy, it allows radioactive material to enter the building. It is important to limit outside air from entering the shelter. Do not use fans for ventilation unless absolutely necessary. If you must use fans, set them on low speed to reduce air intake.

15. GIVING ANIMALS PROTECTED FEED

You may be advised to place animals on protected feed and water. Types of protected feed include:

- Grain stored in covered bins;
- Hay stored in a barn or covered shed;
- Ensiled feed stored in a covered silo or bagged;
- Hay bales covered by a tarp or barrier plastic;
- Ensiled feed from a bunker silo may be used after removing a layer from the unprotected face and top.

Note: Protected feed is feed that has not been stored in the open or exposed to radioactive contamination.

16. GIVING ANIMALS PROTECTED WATER

Animals need water to survive. Even if you have no protected feed during a radiological emergency, animals can live for several days on water alone. Water from enclosed containers and underground sources such as covered deep wells, will be safe for livestock. Water in an open pond or stream should not be used until you are told it is safe to do so.

17. THE FOLLOWING TABLE PROVIDES MAINTENANCE LEVEL FEED AND WATER GUIDELINES FOR COMMON FARM ANIMALS.

	WATER/DAY	FEED/DAY
Cattle		
In production	9 Gallons Summer 7 Gallons Winter	20 Pounds Hay
Dry Cows	9 Gallons Summer 7 Gallons Winter	20 Pounds Hay
Weaned Calves	6 Gallons Summer 3 Gallons Winter	8 – 12 Pounds Hay
Cow (Pregnant)	7 Gallons Summer 6 Gallons Winter	10 – 15 Pounds of Hay
Cow with Calf	9 Gallons Summer 8 Gallons Winter	12 – 18 Pounds of Hay
Calf (400 Pounds)	6 Gallons Summer 4 Gallons Winter	8 – 12 Pounds of Hay
Swine		
Brood Sow with Litter	3 - 7 Gallons	8 Pounds Grain
Brood Sow (Pregnant)	3 - 6 Gallons	2 Pounds Grain
150 Pound Gilt or Boar	3 – 5 Gallons	3 Pounds Grain
Sheep		
Ewe with Lamb	4 Quarts	5 Pounds Hay
Ewe, Dry	3 Quarts	3 Pounds Hay
Weaned Lamb	2 Quarts	3 Pounds Hay
Poultry		
Layers	5 Gallons/100 Birds	7 Lbs./100 Birds
Broilers	5 Gallons/100 Birds	10 Lbs./100 Birds
Turkeys	12 Gallons/100 Birds	40 Lbs./100 Birds
Horses		
All Breeds	5 Gallons/1000 Lbs.	20 Lbs. Hay/1000 Lbs.
Dogs and Cats		
	1 Quart Water/Day/Animal	Leave Dry Food Free Choice

Reference: AVMA

18. PROTECTING WATER SOURCES

Water from drilled wells is expected to be safe for consumption for both humans and animals.

Open sources of water, such as troughs, rain barrels and tanks, should be drained, rinsed and refilled with uncontaminated water after notification that radioactive materials have settled to the ground. A weather event may cause recontamination and necessitate repeating this procedure. To prevent recontamination, cover clean water sources whenever possible.

Water from an open source, such as a pond or stream, should not be used unless shown to be safe. State and local health experts will check water supplies and tell you whether they are safe.

Filler pipes should be disconnected from storage containers supplied by runoff from roofs and other surface drain fields. This will help prevent contaminants from entering the storage containers.

Intake valves on water systems should be closed when you suspect the water source may be contaminated. This will prevent distribution or irrigation until the water is tested and found to be safe.

The following are examples of preventive and emergency protective actions and related information that may be recommended to the agricultural community by appropriate state officials. Location-specific protective action recommendations will be issued by these officials in the event of an actual emergency.

19. PROTECTIVE ACTIONS FOR ALL AGRICULTURAL PRODUCERS

In the event of an emergency, the U.S. Food and Drug Administration (FDA) recommends to protect food, milk, and water from radioactive contamination.

With the exception of placing milk-producing animals on protected feed and water, decisions to recommend preventive and emergency protective actions will be based on measured levels of contamination in food and water samples, as well as health, economic and social considerations

20. PROTECTION FROM CONTAMINATED FOOD PRODUCTS

Trained state officials will sample and analyze all products likely to have been contaminated prior to consumption or marketing. The following specific actions may be advised to reduce the danger of ingesting adulterated food products:

Vegetables and Fruits: Wash, scrub, peel, or shell locally grown fruits and vegetables, including roots, tubers and grapes, to remove surface contamination. Fruits and vegetables ripe at the time of an emergency may be lost because of the personal hazard posed by harvesting contaminated fruit. Fruit and vegetables that do not have to

be picked immediately could be picked and cleaned after the radioactivity decays. If fruits or vegetables are contaminated by short-lived radionuclides, they can be preserved by canning, freezing or storage to allow time for decay of the radioactivity (Radioactive decay is a process whereby radioactivity becomes reduced over time). Fruits and vegetables should not be consumed or sold until you are told that it is safe to do so by state authorities.

Meat and Meat Products: If there is a release of radioactive materials into the environment, you may be advised to place meat animals on protected feed and water and, if possible, provide them with shelter. If livestock consume feed and water contaminated with radioactive materials, some of the contamination will be absorbed into their bodies and could then enter the human food supply through meat and meat products. Meat animals with internal contamination should not be slaughtered until you are told that it is safe to do so by state authorities. Instructions will be given on a case-by-case basis.

State officials will monitor exposure levels in your area and specific to your animals before slaughter. Livestock exposed to external contamination may be used for food if adequately washed and monitored by state officials before slaughtering. Animals can be washed using soap and water. In handling animals, you should wear protective clothing similar to that used for pesticide applications to prevent contaminating yourself.

Milk: Milk should be safe to use if it comes from adequately sheltered dairy animals. If there is a release of radioactive materials into the environment, you may be advised to place dairy animals on protected feed and water and provide them with shelter. If dairy animals consume feed and water contaminated with radioactive materials, some of the contamination will be absorbed into their bodies and could then enter the human food supply through milk and milk products. Milk from animals with internal contamination should not be consumed or sold until you are told that it is safe to do so by state authorities.

Poultry and Poultry Products: If there is a release of radioactive materials into the environment, you may be advised to place poultry on protected feed and water and provide them with shelter. Poultry, especially those kept for egg production, should be monitored by taking samples of poultry products and eggs to determine the presence of radioactive contamination. If poultry products and eggs are found to be contaminated, they should not be consumed or sold until you are told that it is safe to do so by State authorities. Poultry raised indoors and given protected feed and water are less likely to be contaminated.

Grains: In many cases, it is generally a month from the time grains are harvested until they reach the consumer and the wind and rain will probably remove most contamination. Milling or polishing will probably remove any remaining contamination. Sampling and laboratory analysis will determine if the grain is safe to use. Contaminated grain should be stored separately from previously harvested, uncontaminated grain. Grain products should not be consumed or sold, until you are told that it is safe to do so by state authorities.

Bees: Honey and beehives will need to be sampled and analyzed for the presence of radioactive contamination before being approved for marketing and consumption.

Wildlife: Wildlife should not be taken for food until approved by Delaware State officials.

Fish: Recreational fish may continue to be caught and released because dilution of the radioactive material in large bodies of water should make radioactive contamination of fish highly unlikely. Fish raised for food in open ponds or tanks must be tested prior to sale or use as food. Samples of water and fish from open bodies of water will be analyzed to ensure they are safe.

Other Farm Products: Other products such as logs, firewood, Christmas trees, etc., will be tested before their sale or movement outside the affected area.

21. PROTECTION FROM PACKAGED FOOD PRODUCTS

Food in finished packaging prepared before the release of radioactive material will not be harmful to eat as long as the outer wrappings are carefully removed and discarded.

22. PRODUCERS, MILK PROCESSORS, WAREHOUSES AND COMMODITY TERMINALS

When practical, windows and vents should be closed. Any system that draws air from the outdoors to the inside should be shut down, such as vacuum systems, air conditioners and compressed air systems.

The DEMA, the DDA or the USDA will inform you when it is safe to harvest, process, prepare and market your food products.

In addition, government officials will provide information concerning corrective actions post incident. Depending upon the amount and type of radioactive material deposited, there may be a period of time when you may not be able to cultivate your land or market farm products. Representatives from various state agencies will monitor the situation and issue instructions about working on your farm.

23. PERSONAL SAFETY

Producers may be required to evacuate. If you have been given the option to remain at your farm during a radiological event, please adhere to the following recommendations:

1. Avoid plowing, cultivating, discing, baling, or harvesting.

2. Wear protective clothing (similar to that worn during pesticide applications) when working outdoors. Remove all outer clothing before entering your home.

3. Wash exposed areas of your skin before eating or drinking.

4. Consult with State officials about the disposition and guidelines for the use of protective clothing and dust filters.

Note: These same recommendations may apply for a period of time following the event.

24. PROTECTION FROM CONTAMINATED SOIL POST-EVENT

The State of Delaware will take soil samples if your farm is located in the contaminated area to determine if your farm is safe to work or if any other precautions are necessary. If the soil is contaminated above established safety levels, it may be necessary to keep the land fallow for an extended period of time. The length of time depends on the amount and type of radioactive material deposited. After that, the land could be returned to normal use. In situations involving highly contaminated soil, removal and disposal of the soil may be more appropriate. State and local officials will advise you on the use of your land after an emergency.

25. PASTURE MANAGEMENT, POST-EVENT

Producers of dairy, beef, swine, sheep, goats, buffalo, or free-range poultry will need to consult with DEMA before allowing these animals to graze or prior to being turned out in open areas. Animals may come in contact with contaminated feed, hay, grasses, or soil. DEMA officials will advise you regarding the use of pastures, fields, or barren ground used for animal turn out.

26. BUILDINGS AND EQUIPMENT

Monitoring contamination levels by the State of Delaware will determine whether any buildings or equipment have been contaminated. If contamination has occurred, you will be advised on decontamination procedures. Cleaning does not destroy radioactivity but it does remove it from areas where people may be exposed.

27. SUGGESTIONS FOR WRITING A PLAN

The following space is provided for your thoughts, evacuation options if needed, contact numbers, resource list, etc., to assist you if an emergency does occur.

Protect yourself, your family, and your employees from unnecessary exposure. Avoid needless handling of contaminated materials. Leave plants and crops in the ground until advised by State or local officials. If you are directed to destroy milk or produce, you will be given specific instructions on how and where this is to be done. Keep records of any losses or expenses you may incur.

28. THE FOLLOWING SECTIONS DESCRIBE POST-EMERGENCY ACTIONS IF CONTAMINATION IS VERIFIED:

Restricted Zone(s)

A restricted zone is an area with controlled access from which the population has been evacuated or relocated.

Re-entry

Re-entry is the temporary entry, under controlled conditions, into a restricted, contaminated area. If you have been evacuated from your area, you may be allowed to return temporarily to your farm when conditions permit. State officials will advise you through EAS broadcasts, or other official means, if a decision to permit re-entry is made. You will receive specific instructions on routes to use and safety precautions to take. Re-entry will allow you to perform such vital activities as milking, watering, and feeding for animals.

Relocation

The non-emergency removal of populations from areas that are to be restricted due to projected exposures from deposited radioactive materials that exceed protective action guidelines.

Return

The orderly reoccupation of areas that were evacuated during the emergency phase of an accident or from which populations were relocated during the post-emergency phase.

Recovery

Recovery is the process of reducing radiation in the environment to acceptable levels for normal daily living. Following the emergency, State officials will identify the

types and levels of contamination. They may need to take samples of air, water, soil, crops, and animal products from your farm or business. They will provide you with instructions and assist you in decontaminating your animals, food and property, if such actions are necessary.

Temporary Embargoes

Following a radiological emergency, and in some cases during an emergency, State officials may restrict the movement of food products and withhold them from the marketplace if they are found to be contaminated. These products should not be released until they are safe for consumption, or until a decision is made to dispose of them. You will be instructed how to safety handle, mangage, and/or dispose of contaminated food products and crops, and how to decontaminate your animals and property, if such actions are necessary. Contaminated food will be isolated (temporary embargoes) to prevent its introduction into the marketplace. State officials will determine whether condemnation and disposal are appropriate.

Condemnation

The designation of agricultural products as unfit for consumption, as determined by State officials.

Reimbursement

The repayment for economic losses caused as the result of an accident at a nuclear power plant. Federal legislation requires nuclear power plants to participate in an insurance pool to cover legitimate claims for losses incurred as the result of a radiological emergency.

In conclusion, while it is unlikely that a serious radiological emergency will occur in this country, it is important that we are prepared for such an event. The information in this brochure may help you to more effectively respond to such an emergency.

For More Information Contact

State of Delaware
Department of Agriculture
Telephone No.: (302) 698-4500
Hours 8:00 a.m. – 4:30 p.m.
Website: www.dda.delaware.gov

Department of Safety and Homeland Security
Delaware Emergency Management Agency
Telephone No.: (302) 659-3362 or 1-877 729-3362
Hours 8:00 a.m. – 4:30 p.m.
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United States Department of Agriculture
Telephone No.: (302) 678-4250

DEMA
DELAWARE EMERGENCY MANAGEMENT AGENCY
Partners for Protection and Response

DAR
Delaware Animal Response

Delaware DEPARTMENT of AGRICULTURE
Serving Agriculture and Protecting Consumers

USDA United States Department of Agriculture